

# **RENCI's Role in National Cyberinfrastructure**

**Leading the OSG Engagement Efforts**



## A **framework** for large scale distributed resource sharing addressing the technology, policy, and social requirements of sharing

RENCI's role in OSG is to lead the Engagement effort, which brings new users to OSG (non HEP), and enables universities and government labs to build a local cyberinfrastructure, interconnected with this large and growing national CI.

Brings petascale computing and storage resources into a uniform grid computing environment

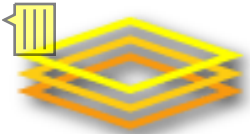
Integrates computing and storage resources from over 50 sites in the U.S. and beyond





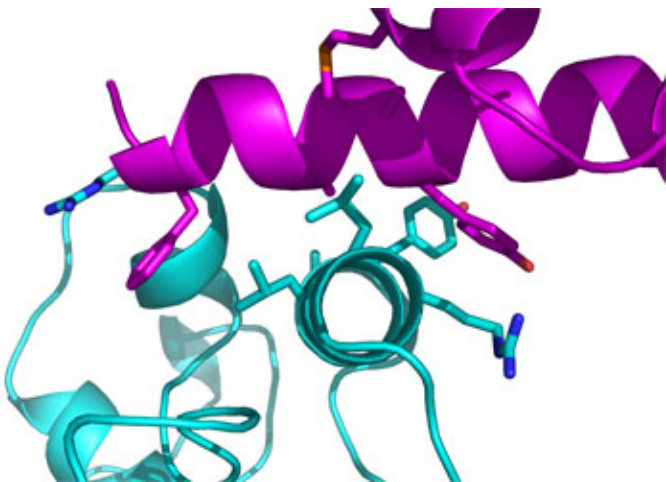
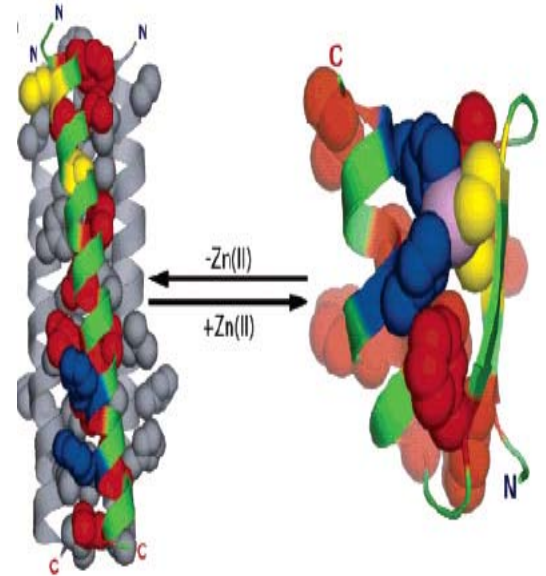
## Engagement Mission

- Help new user communities from diverse scientific domains adapt their computational systems to leverage OSG
- Facilitate University Campus CI deployment, and interconnect it with the national organizations
- **Develop a CI enabled workforce of scientists and educators**



## Sample Engagement: **Kuhlman Lab**

Using OSG to design proteins that adopt specific three dimensional structures and bind and regulate target proteins important in cell biology and pathogenesis. These designed proteins are used in experiments with living cells to detect when and where the target proteins are activated in the cells

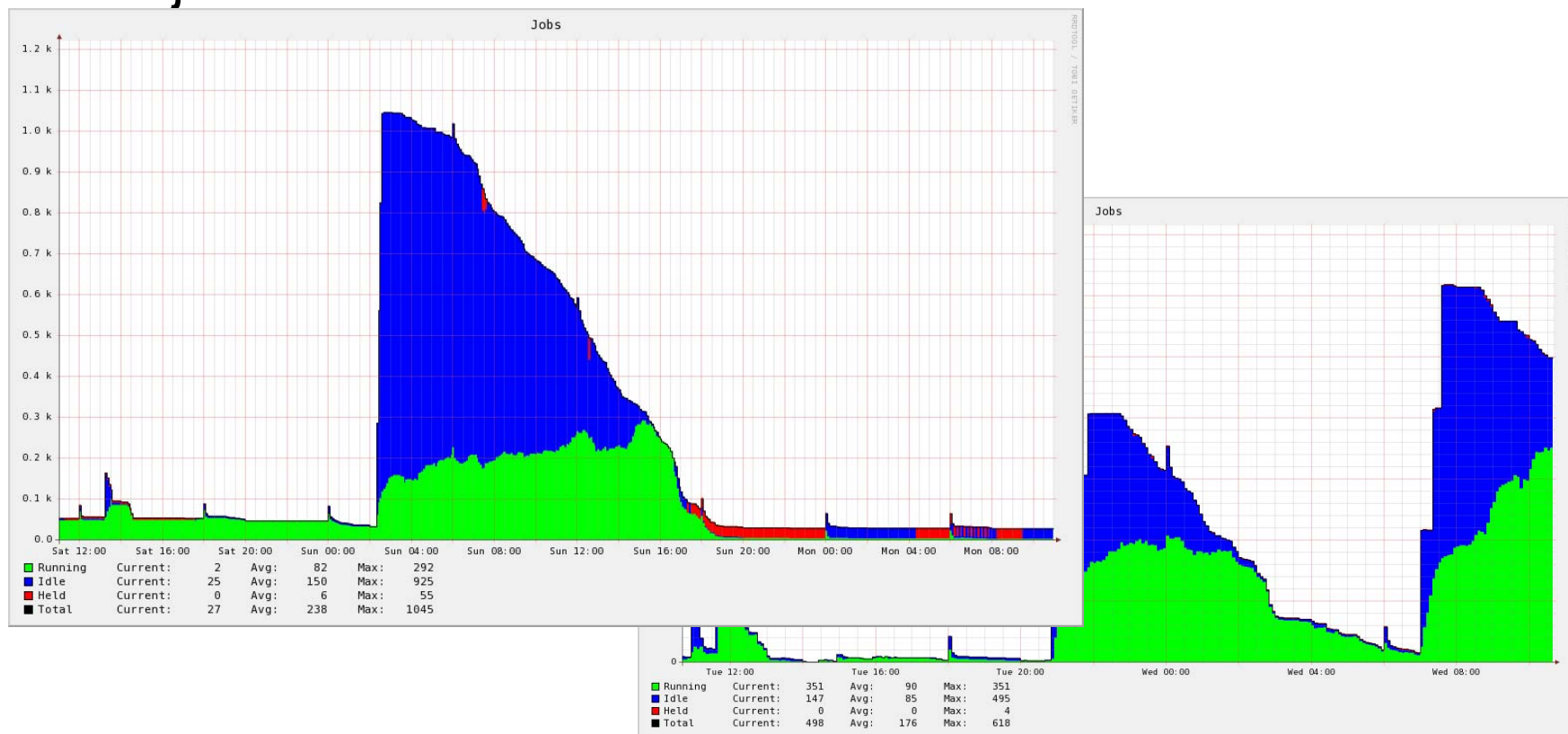


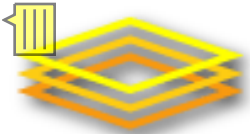
Sr. Rosetta Researcher and his team, little CS/IT expertise, no grid expertise. Quickly up and running with large scale jobs across OSG, **>250k CPU hours**



## Rosetta on OSG

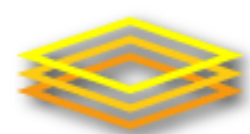
- Why resources selection is important
  - Each protein designed requires about 3,000 CPU hours, distributed across 1000 individual compute jobs





## Resource Selection

- Job submission and management for small labs/experiments
- Based on existing OSG infrastructure
  - ReSS (Resource Selection Service), Condor-G
- Component of a hosted VO infrastructure provided for users
- Easy to use meta-scheduling and fault avoidance
  - Site verification: sites are verified every 4 hours
  - Recent performance of job throughput and job success rate per site enables:
    - Job load re-balancing
    - More intelligent scheduling
    - As a site services Engage jobs well, it matches more, as it slows in servicing Engage jobs, it matches less

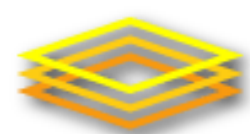


# More Information

- ReSS (Resource Selection Service):  
<https://twiki.grid.iu.edu/twiki/bin/view/ResourceSelection/WebHome>
- OSG Engagement VO  
<https://twiki.grid.iu.edu/twiki/bin/view/Engagement/WebHome>
- Questions?
  - Email: [osg@renci.org](mailto:osg@renci.org)



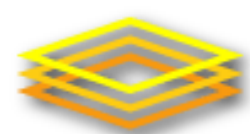
**END**



# Visualization: Live Feed

- Data feed is usually live
  - For demos, a recorded data file can be used (like the one on the screen below)
- Simple ASCII format

```
site Purdue-RCAC rank 0
site Purdue-RCAC longitude -86.911 40.444
job E564AEC3BDBB8556FCBD518A14C289E2 state MATCHING
job E564AEC3BDBB8556FCBD518A14C289E2 tosite MATCHING
job E564AEC3BDBB8556FCBD518A14C289E2 state SUBMITTING
job E564AEC3BDBB8556FCBD518A14C289E2 tosite Purdue-RCAC
job E564AEC3BDBB8556FCBD518A14C289E2 state QUEUED
job E564AEC3BDBB8556FCBD518A14C289E2 state RUNNING
```



# Visualization Application

- Application built using open source, cross-platform libraries:

- Visualization ToolKit (VTK) : [www.vtk.org](http://www.vtk.org)



- wxWidgets : [www.wxwidgets.org](http://www.wxwidgets.org)



- Can connect to live data stream via socket connection, or read from data file
- Configurable visualization parameters using config file or GUI controls
- Stereo and Dome render modes